

# **Progress Report #1**

For the project entitled:

## **Field Investigation of Geosynthetics Used for Subgrade Stabilization**

*Reporting Period: February 1 - June 30, 2008  
(Fourth Quarter of State Fiscal Year 2008)*

Submitted by:

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Submitted to:

**Montana Department of Transportation**  
Research Programs  
2701 Prospect Avenue  
Helena, Montana 59620

and

**NAUE GmbH & Co. KG**  
Gewerbestraße 2  
D-32339 Espelkamp-Fiestel  
Germany

August 13, 2008

**Task 0: Project Management**

The project team consists of the following individuals:

- Eli Cuelho, Principal Investigator;
- Steve Perkins, co-Principal Investigator;
- Michelle Akin, Research Associate;
- Jason Harwood, Research Associate;
- Justin Hauck, Graduate student; and
- Linsey Allen, Undergraduate student.

A kick-off meeting was held in Helena on March 31, 2008 to introduce the project team to the technical panel and discuss the scope of the project. The project is on budget and on schedule.

**Task 1: Design and Construction of Test Sections**

- Location: TRANSCEND research facility in Lewistown, Montana.
- Make up: 11 geosynthetic test sections (each 15 m long) and 2 control sections (each 20 m long).
- Design: The subgrade and base course were designed through an iterative application of the FHWA-adopted US Forest Service method (FHWA, 1995).
  - ♦ Design strength of the subgrade soil is a California Bearing Ratio (CBR) value of  $1.7 \pm 0.1$ .
  - ♦ The design thickness of the base course is 20 cm. Base course is a CBC 6A as specified by Montana Department of Transportation.
  - ♦ The control sections are expected rut 10 cm (considered failure) within 100 passes of a fully loaded 3-axle dump truck. The geosynthetic sections are expected to rut to 10 cm at 1,000 passes.
- Construction: Request for Bids distributed to several Lewistown contractors (see Appendix) at a pre-bid meeting which was held on June 2, 2008. This request outlines the following construction items:
  - ♦ excavation of pit,
  - ♦ line with plastic liner to maintain moisture control,
  - ♦ install subgrade to specified strength and moisture content,
  - ♦ construct base course, and
  - ♦ forensic excavations after trafficking.
- Artificial Subgrade: 1638.8 metric tons of the artificial subgrade soil was purchased from Casino Creek Concrete and delivered to the site May 29-30.
  - ♦ Excavation of the test pit began on June 30 (Figure 1) and was nearly finished by the end of the day. The construction of the test bed will conclude next quarter.



**Figure 1: Excavation of test pit**

**Action Items for Next Quarter:**

- ◆ Finish excavation of test pit
- ◆ Build artificial subgrade
- ◆ Install instrumentation and geosynthetics
- ◆ Construct base course

**Task 2: Soil Testing and Instrumentation**

- Bottom of trench: density will be measured on the bottom of the excavated trench to ensure uniformity along the length of the test site.
- Artificial Subgrade Soil:
  - ◆ Soil classifies as A-6 (2) or SC (clayey sand)
  - ◆ Unsoaked California Bearing Ratio (CBR) strength tests were conducted to determine the relationship between CBR, vane shear, water content, and density. CBR tests were conducted on  $\frac{3}{8}$ -inch-minus soil only to reduce the effects of larger stones on the test results. Based on the regression equation, field vane shear data between 52 and 62 kPa will meet construction specifications (i.e.,  $\text{CBR} = 1.7 \pm 0.1$  (Figure 2). Other soil properties, such as dry density and moisture content, produced less distinct relationships to soil strength, (Figure 3 and Figure 4). Even so, moisture contents in the field will be approximately 18 percent to reach this CBR value.
  - ◆ Moisture content, density and strength of the artificial subgrade will be measured during construction to ensure they meet the specifications and are uniform throughout. Density will be measured on the final lift only using a nuclear densometer. Shear strength will be measured using a hand held vane shear device and a dynamic cone penetrometer.
- Base course: density and thickness of the base will be measured to ensure uniformity along the length of the test site.

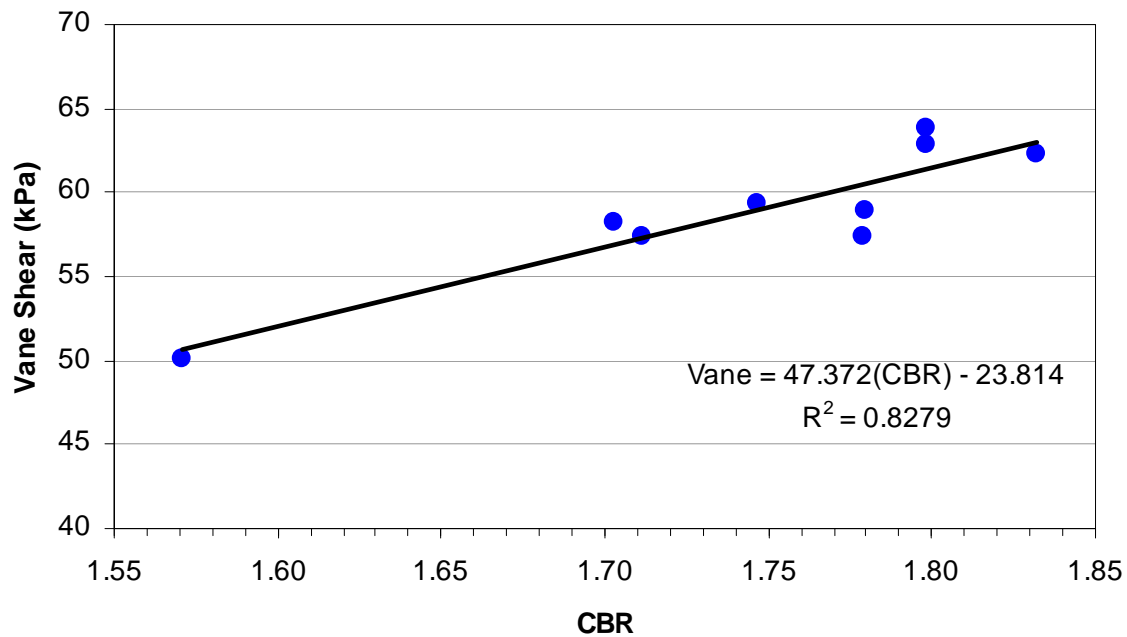


Figure 2: Relationship between CBR and vane shear

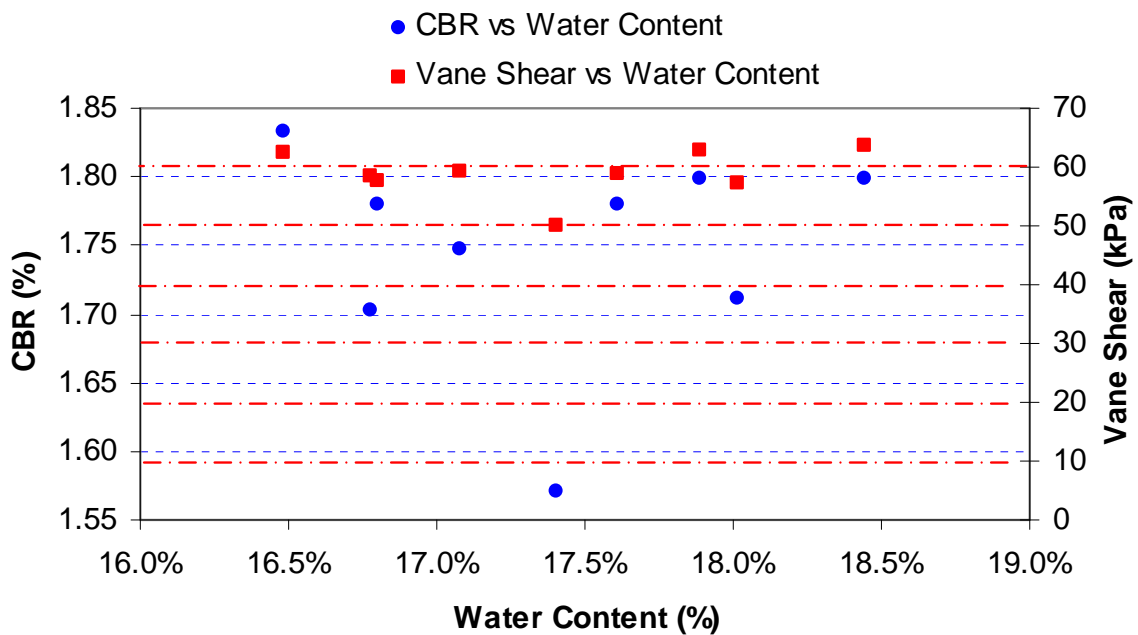


Figure 3: Relationship between strength parameters and water content

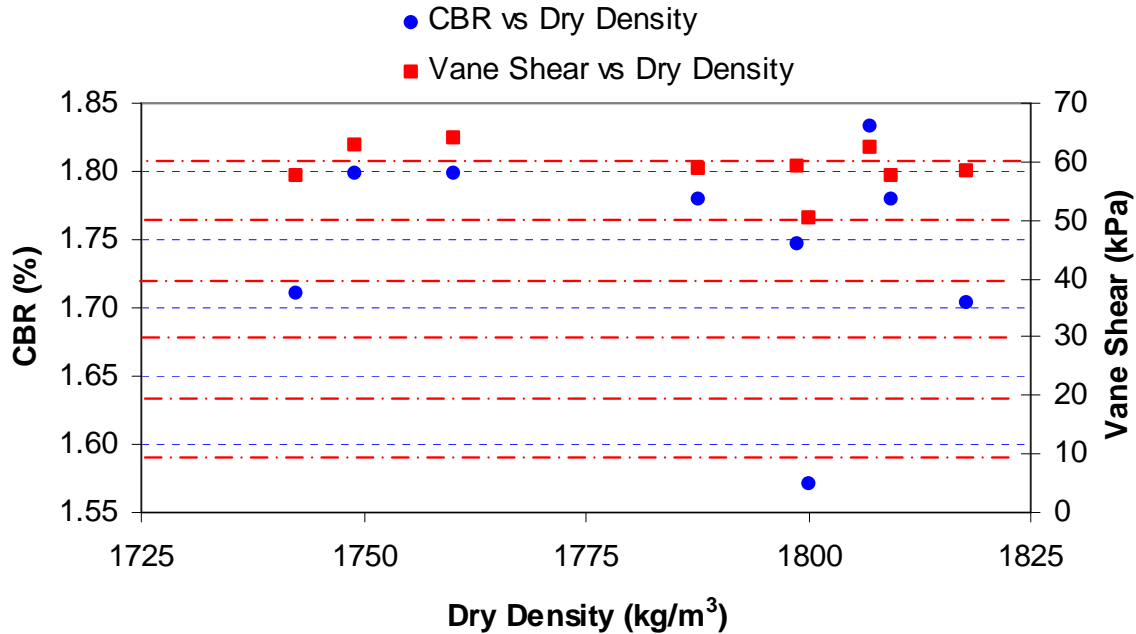


Figure 4: Relationship between strength parameters and dry density

- Instrumentation:
  - ♦ Pore water pressure gages were purchased and are being set up so that a porous stone attached to a semi-rigid plastic tube filled with water will be placed 15 cm beneath the top surface of the subgrade directly under the wheel path of the truck to measure static and dynamic measurements of pore water pressure during loading.
  - ♦ Displacement will be measured at three locations of each geosynthetic using Linear Variable Displacement Transducers (LVDTs). Lead wires will be attached to the geosynthetic and run through rigid tubes back to the LVDTs mounted in sensor boxes that are rigidly mounted to the pavement. Static and dynamic displacement measurements will be made in the area of the rut bowl during loading.
  - ♦ Data acquisition equipment consists of three Campbell Scientific CR5000 data acquisition computers. A solar power system was designed and purchased to provide power to the instrumentation hardware.

**Action Items for Next Quarter:**

- ♦ Measure soil parameters of the in-situ soil, artificial subgrade and base course to ensure they meet specifications and are uniform
- ♦ Assemble and calibrate pore water pressure sensors
- ♦ Purchase and calibrate LVDT displacement sensors
- ♦ Install solar power system for data acquisition purposes
- ♦ Complete data acquisition programming and install instrumentation

- ♦ Build and install sensor boxes
- ♦ Run wiring from sensors to data acquisition equipment

### **Task 3: Vehicle Loading and Data Collection**

- Test Vehicle: trafficking will be done by a three-axle dump truck rented and driven by WTI staff. The truck will be loaded to be at approximately the legal limit.
- Data collection: Intermittent surveys of the longitudinal and transverse rut profiles will be measured to monitor rut development during trafficking.

#### **Action Items for Next Quarter:**

- ♦ Load rented dump truck to legal limit and weigh individual axles
- ♦ Traffic test bed with dump truck
- ♦ Survey rut developments and collect static and dynamic measurements of pore pressure and displacement using the data acquisition system

### **Task 4: Analysis**

This task will begin next quarter.

### **References**

FHWA (1995), *Geosynthetic Design and Construction Guidelines*, FHWA-HI-95-038, 417p.

## **Appendix**

### **Request for Bids for Subgrade Stabilization Test Bed Construction**

## Request for Bid

*It is important that you carefully read this entire request for bid so that you fully understand what the project entails. This document has been updated to reflect the discussions that occurred during the Pre-Bid Meeting. New and altered text is highlighted. Any questions regarding its contents may be directed to Eli Cuelho of the Western Transportation Institute via email or telephone using the following contact information:*

**Eli Cuelho, P.E.**  
**elic@coe.montana.edu**  
**(406) 994-7886**

### **1. DESCRIPTION OF WORK**

#### **1.1. Purpose**

The purpose of this work is to construct an artificial road for research purposes made of a weak subgrade soil layer overlaid by several geosynthetics and a typical base course gravel layer.

#### **1.2. Background**

Road construction in many western states can occur on weak native soil deposits. In areas where excavation and replacement of these soils is not cost effective (e.g., temporary roads or haul roads), soil stabilization may be necessary to provide a working platform so that the base course gravel layer can be properly constructed. Geosynthetics are planar polymeric materials that have been extensively used in these situations (i.e., subgrade stabilization), but research projects to study side-by-side comparisons of various products are less common. In addition, many of these studies are conducted on actual road construction projects where soils may vary from place to place, thereby making it difficult to discern the true reason for differences in performance between different geosynthetic products. Therefore, a research project was recently initiated with the Montana Department of Transportation and a geosynthetic manufacturer to study the behavior of several geosynthetic materials and measure how well they perform on a uniformly prepared weak subgrade.

The relative benefit of several types of geosynthetic materials used for subgrade stabilization will be evaluated using a clayey sand subgrade conditioned and constructed to have low strength. In order to accurately evaluate the relative ability of various geosynthetics to stabilize these weak soils, it is very important that the conditions along the artificial road be as consistent as possible so that statistically relevant side-by-side comparisons can be made. Therefore, construction tolerances such as thickness, moisture content, and strength are more stringent. Detailed construction requirements for this work are described in the sections to follow.

This project will be constructed on a section of decommissioned taxiway south of the Lewistown municipal airport. The existing pavement structure will be excavated and replaced with specially prepared subgrade soils. Western Transportation Institute (WTI) staff from Montana State University will monitor all aspects of construction to ensure uniformity and consistency. Specifically, density, water content, vane shear, dynamic cone penetration, and/or California

Bearing Ratio (CBR) of the subgrade and base materials may be used to ensure consistent and uniform conditions along the test site.

After the artificial subgrade material has been properly constructed, WTI will install instrumentation in the subgrade as well as several geosynthetics on the surface of the finished subgrade. Instrumentation will also be attached to the geosynthetics and electrical plumbing will be installed to facilitate communication between the sensors and a data acquisition computer located near the test site. At this point, the contractor will then carefully prepare, place and compact the base course material to facilitate truck traffic over the artificial road. Trafficking of the test area will be done by WTI staff. After trafficking, specific sections of the test area will be excavated to make post-test forensic observations and assess damage to the embedded geosynthetic materials.

### **1.3. Location of Project**

The project is located at the Transcend test facility south of the Lewistown municipal airport in Lewistown, Montana as shown in the attached maps and pictures (Figure 1). The construction will occur on the western side of a decommissioned north-south taxiway 12 feet from the western edge of the taxiway. WTI will mark out the location of the construction boundaries prior to construction.

### **1.4. Construction Details and Specifications**

The following steps are involved in the construction of the artificial road:

1. excavation of existing roadbed to make a trench,
2. installation of a plastic liner in the trench,
3. preparation and placement of the subgrade soil,
4. installation of instrumentation and data acquisition hardware (done by WTI),
5. installation of the geosynthetics (done by WTI),
6. preparation and installation of the base course aggregate, and
7. post-test excavation in specific areas to facilitate forensic analyses.

Three construction drawings in Appendix A provide a plan view and two cross-sectional perspectives of the project dimensions.

A mandatory pre-bid meeting will be held in Lewistown, Montana for all interested contractors on Monday June 2 to meet WTI, review specific details regarding the project, see the project location, assess the subgrade material and ask questions. The meeting will begin at 9:00AM at the Montana Department of Transportation, 1620 Airport Rd, Lewistown, MT 59457 in the conference room.

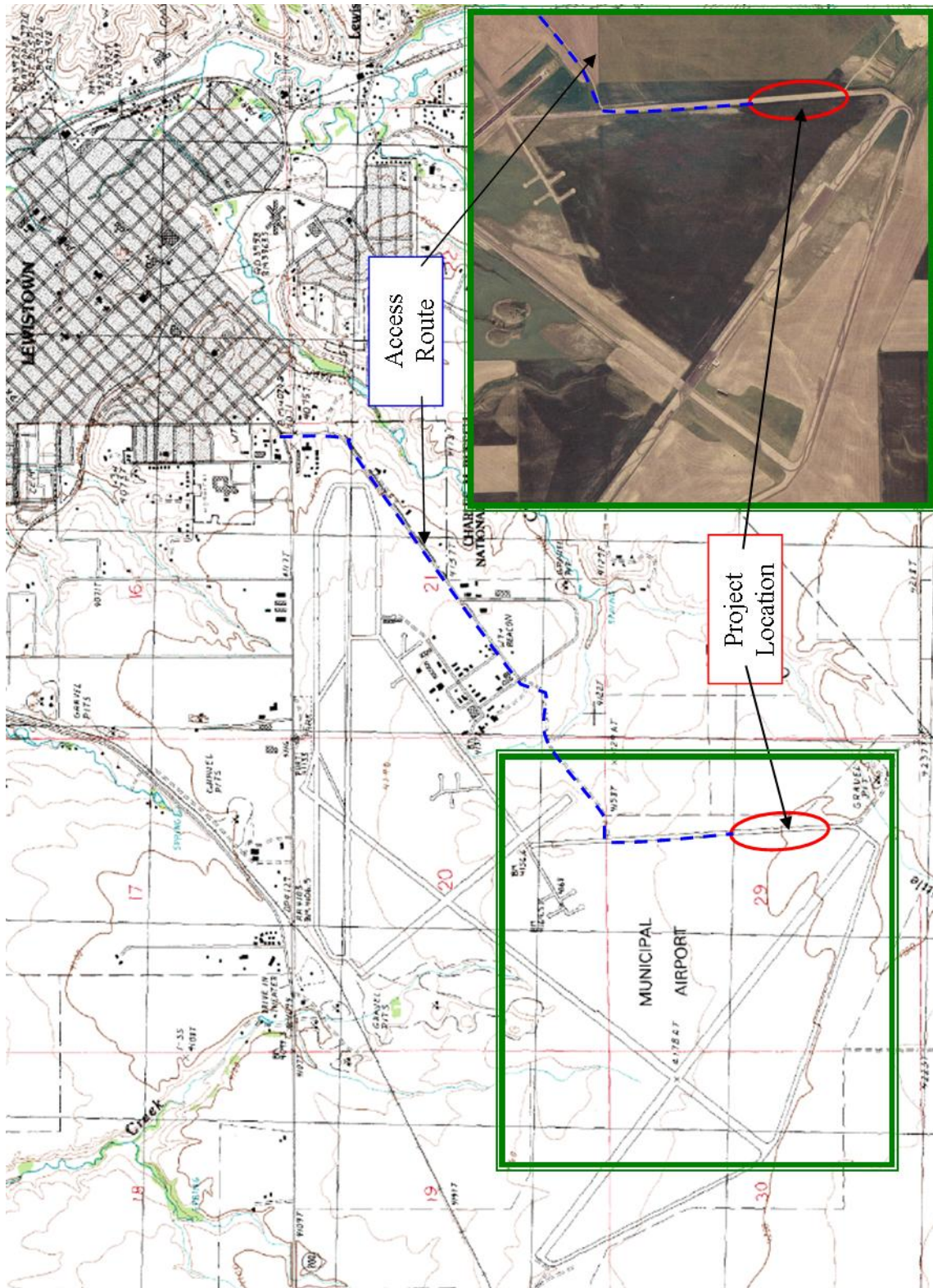


Figure 1: The location of the project is towards the southern portion of the decommissioned north-south taxiway at Lewistown Airport.

**A. Excavation:**

The dimensions of the excavation that will be later filled with the weak subgrade material are 13 feet wide by 690 feet long by 3 feet deep. A tapered access that extends beyond both ends of the excavated trench will be necessary to facilitate the movement of construction equipment into and out of the trench during construction. The suggested length and slope of these access ramps are approximately 12 feet long based on a slope of 4:1, as shown in construction drawing #2. All excavated materials will be disposed of using belly-dump trucks alongside an existing access road approximately 1 mile from the excavation.

There is currently approximately 4 to 8 inches of asphalt pavement surfacing that needs to be removed as part of the excavation. The edges of the excavation area should be cut prior to material removal to create a clean edge along its length. Contractors will be able to tour the project site during the pre-bid meeting to evaluate the current conditions of the test site.

The elevation of the bottom of the trench should be grade controlled to be within 1 inch of the specified 3 foot depth based on a 6 foot by 25 foot grid. The bottom of the trench should also be uniformly compacted to a minimum of 90% of the maximum dry density and within 2% of the optimum moisture content as determined by the Proctor test (ASTM D698 or D1557). The contractor will provide sufficient soil samples to WTI in order to conduct Proctor tests (approximately 100 pounds or two 5-gallon buckets of material). Grade must be maintained and measured by the contractor and will be inspected by WTI before moving ahead with the next step in construction. Areas that do not meet these specifications must be modified by the contractor before continuing with the remaining construction items.

The sides of the trench must be kept as vertical as possible without the use of shoring equipment. Therefore, care must be taken when excavating the trench so that the sidewalls are kept intact. Some sloughing of sidewall materials is expected but should be minimized. In areas with excessive sloughing it may be necessary to stabilize, reclaim or clean the affected area to maintain a smooth working surface at the bottom of the trench.

**B. Liner Installation:**

A 6-mil plastic liner (e.g., clear low density polyethylene construction plastic, visqueen) must be installed along the bottom and sides of the excavated trench prior to placing the subgrade material. This liner will be used to prevent moisture loss in the artificial subgrade material during construction and future testing. It is not intended that the liner completely waterproof the area, but rather ensure that the moisture content of the artificial subgrade will remain consistent over time. The specified plastic liner must extend past the sides of the trench at least 6 feet on each side and be sufficiently secured to keep from moving or blowing away as the trench is filled. If several pieces of plastic are necessary to completely line the trench, adjacent pieces should overlap approximately 2 feet with one another. Care must be taken to prevent significant damage to and movement of the liner as the first layer of subgrade is placed in the trench. This may be accomplished by preparing the first lift of subgrade soil outside of the trench, or having a thicker first lift to accommodate mixing equipment; however, the thickness of the first lift should not exceed 12 inches.

**C. Preparation and Placement of Artificial Subgrade:**

The clayey-sandy soil to be used as the artificial subgrade fill will be located on the taxiway just north of the excavated trench. In order for this project to be successful, the subgrade soil must be prepared and placed uniformly in the trench. The soil should be placed into the trench via construction equipment from the east side of the trench only. The only equipment that should be operated within the trench is the wetting, mixing and compacting machinery. It is possible that lightweight construction equipment, a water truck, and possibly farm equipment (such as discs, etc.) may be needed to construct the section to contract requirements.

The artificial subgrade must be prepared and compacted so that it has a California Bearing Ratio (CBR) strength of  $1.7 \pm 0.1$  throughout. As a point of reference, a soil with a CBR of 1.7 resembles soil that has an R-value of approximately 2.8. The CBR strength of the subgrade will be monitored by WTI during the construction process to ensure uniformity. Any area of the subgrade that does not meet these criteria will be modified or removed until the strength meets the aforementioned strength criteria. Most likely a high CBR (i.e., too strong) can be addressed by adding water discing and/or re-mixing followed by compaction, whereas areas having a low CBR (i.e., too weak) may need to be dried, disced and re-compacted, or removed and replaced.

The subgrade will be placed in lifts approximately 6 inches thick. The natural volumetric water content of the loosely piled subgrade soil is approximately 10%. To achieve the specified CBR of  $1.7 \pm 0.1$ , the moisture content of subgrade soil should be approximately 13% and be compacted to have uniform density. The strength of the subgrade is highly dependent on the water content of the soil. The approximate density of the compacted subgrade material has not yet been determined but will be provided to the contractors prior to construction. Preparation of the subgrade at the aforementioned moisture content and density will help achieve the design CBR; however, minor modifications to these parameters may be necessary to achieve the specified CBR strength in the field. During construction, WTI will frequently measure CBR using a vane shear device, which provides an immediate indication of the actual subgrade strength. At least 4 vane shear tests will be performed within every 10-foot length of the constructed subgrade. If the test results indicate that the specified CBR has not been met, additional measurements will be taken to determine the extent of the area that needs to be remedied. The water content and density of the compacted subgrade should be uniform throughout to ensure consistent strength characteristics of the artificial subgrade. WTI will frequently measure vane shear, but may also use a nuclear densometer to evaluate moisture content and density for additional information. WTI will demonstrate the use of the vane shear device at the pre-bid meeting.

Even after approval of portions of the subgrade has been granted, WTI may continue monitoring the strength and/or water content to ensure that the subgrade strength does not change over time. If the subgrade strength falls outside of the specified limits, it will be necessary to remedy the affected area as previously described. To minimize any changes in moisture and subsequently soil strength, the subgrade should be covered with a sufficiently thick layer of wet burlap and overlaid by plastic by the contractor when it is not actively being constructed. It may be necessary at times to recharge the burlap with additional water or rewet the surface of the

subgrade to prevent moisture loss over longer periods of time. In the event that moisture loss or other environmental conditions cause the subgrade strength to change, it will be necessary to remove or reconstruct the affected areas prior to finishing the subgrade construction. All final modifications to the subgrade must be made prior to the installation of the instrumentation or the geosynthetics by WTI (as described in the next section). Extra care must be taken to maintain the subgrade strength and moisture content once it is constructed (e.g., covering with wet burlap and plastic, rewetting etc.).

The final grade of the subgrade should be crowned along the centerline and have about a 1% slope towards each edge. The edges of the subgrade should be 1 inch above the original taxiway surface and the centerline crown should be 2 inches above the grade of the taxiway (see construction drawing #3). This grade should be controlled to be within 0.5 vertical inches based on a 6 foot by 25 foot grid. Grade must be maintained and measured by the contractor and will be inspected by WTI before moving ahead with the next step in construction. Areas that do not meet these specifications must be modified by the contractor before continuing with the remaining construction items.

The surface of the prepared subgrade soil must be covered at all times with a sufficiently thick layer of wet burlap (or similar material) and plastic to prevent moisture loss from the top. It may be necessary at times to recharge the burlap with additional water to prevent moisture loss over longer periods of time. The burlap and plastic tarp used to cover the subgrade must be available throughout the duration of the project.

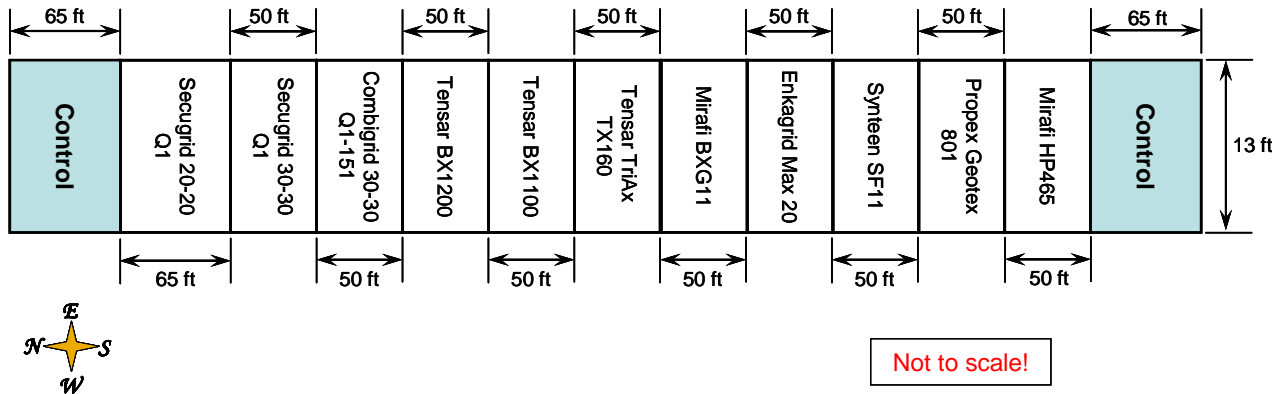
#### **D. Sensors and Geosynthetic Installation**

After completion of the subgrade construction, WTI will install sensors in the subgrade and install the geosynthetics on the surface of the subgrade. Eleven different geosynthetic products will be installed along the length of the test area, as illustrated in Figure 2. Each individual geosynthetic test section will be 50 feet long, except for one section measuring 65 feet in length. As noted in Figure 2, geosynthetics will not be installed in two test sections known as the controls (one at each end of the test area). Thus, there are 13 total sections (11 with geosynthetics, 2 without) along the length of the test area. Thirteen sensors to measure pore water pressure in the subgrade will be installed prior to installing the geosynthetics. These sensors will be placed at a single location within each of the previously mentioned 13 test sections. Additional sensors to measure displacement of the geosynthetic will be installed after placement of the geosynthetic. Wires associated with these sensors will be run through schedule 80 PVC protective conduit and will exit the construction area on the west side of the test site. These wires will be routed into special boxes that will be bolted to the pavement by WTI. Care must be taken not to disturb the electrical conduit and the sensor boxes after they are installed by WTI. The subgrade will be covered by WTI to minimize changes in moisture content during these installations.

#### **E. Base Course Construction:**

After placement of the subgrade soil, sensor installation and geosynthetic installation, the gravel road surface can be constructed. The material to be used as the gravel surface is a Type A Grade

6 Crushed Base Course that meets MDT specifications. Refer to Section 701.02.4 of the 2006 Edition of Standard Specifications for Road and Bridge Construction adopted by Montana Department of Transportation and the Montana Transportation Commission, which can be downloaded at [http://www.mdt.mt.gov/other/contract/external/standard\\_specbook/2006/2006\\_stand\\_specs.pdf](http://www.mdt.mt.gov/other/contract/external/standard_specbook/2006/2006_stand_specs.pdf). The applicable gradation table for the specified material is reproduced in Table 1.



**Figure 2: Layout of geosynthetics after subgrade construction (WTI will install the geosynthetics and sensors)**

**Table 1: Table of Gradations - Crushed Base Course Type "A"**

Sieve Size	Percentage By Weight Passing Square Mesh Sieves	
	Grade 6A	
	Job Mix Target Limits	Job Mix Tolerance
1 1/2 inch (25 mm)	100	
3/4 inch (19.0 mm)	82-88	±8
3/8 inch (9.5 mm)	52-64	±12
No. 4 (4.75 mm)	36-48	±12
No. 10 (2.00 mm)	16-24	±10
No. 200 (0.075 mm)	3-5	±3

The base course material must be constructed at a specific water content and uniform density. The target water content and density will be determined by WTI according to the Proctor test (ASTM D698 or D1557) once sufficient samples of the selected material are delivered to WTI by the contractor (approximately 250 pounds or five 5-gallon buckets full of aggregate). This material will be evaluated by WTI to make sure that it meets the gradation specification. To achieve uniform moisture throughout, the water must be mixed with the base course using tilling or discing equipment. The mixing operations must not be done directly on top of the subgrade and geosynthetics, but can be done on the east side of the construction area adjacent to the test plot.

The base course shall be constructed to be 13 feet wide and 740 feet long centered over top of the subgrade, as shown in construction drawing #2. Tapered edges will extend from these dimensions on all sides of the base course. The edges along the east and west side of the compacted gravel layer are tapered at a 3:1 slope (construction drawing #3) and the north and

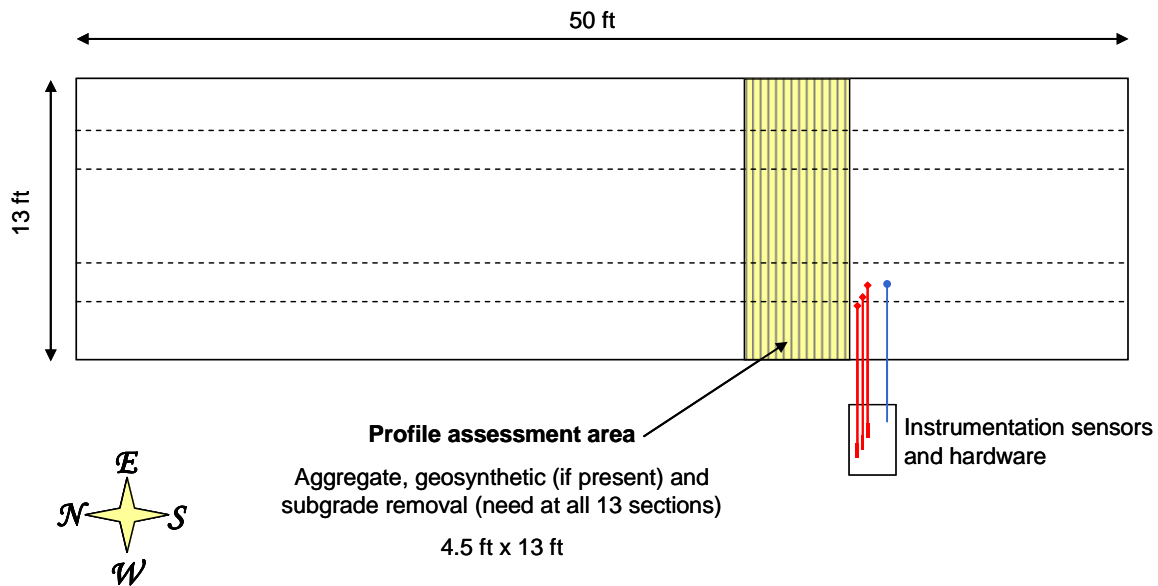
south ends of the compacted gravel layer are tapered at an 8:1 slope (construction drawing #2). The depth of the compacted base course will be 8 inches  $\pm$  0.25 inches and constructed in a single lift. The finished aggregate surface has a smoothness tolerance of 0.04 feet (0.48 inches) per 60 feet of distance, which is consistent with the standard MDT specification found in Section 301.03.5G. The final grade of the base should be crowned along the centerline and have about a 1% slope towards each edge (see construction drawing #3). This grade should be controlled to be within 0.25 vertical inches based on a 6 foot by 25 foot grid.

Construction of the base course will occur from the east side of the test area rather than the ends to avoid uneven construction traffic along the project length which may alter material properties of the subgrade and/or geosynthetics. Construction along the length of the test area must be done similarly to make sure that each individual test section (having a unique geosynthetic product) receives the same amount of compaction due to construction, etc. A methodology to construct the base course must be proposed by the contractor prior to its construction. WTI will review this methodology with the contractor to ensure that it is acceptable. Extra care must be taken during construction not to disturb or damage the geosynthetic materials or sensors. If the geosynthetics are damaged during construction due to negligence (not normal construction activities), the contractor will be responsible for replacing the damaged geosynthetics and reconstructing the affected area. Schedule 80 PVC conduit will be used for the sensor wires, but more careful compaction above these areas with light equipment may be needed. The moisture barrier covering the subgrade/geosynthetics (i.e., wet burlap and plastic cover) should only be removed immediately prior to constructing the base course to minimize moisture loss.

The base course should be compacted to 95%  $\pm$  2% of the target density. WTI will measure the density of surfacing aggregate at a minimum of 3 locations in each of the 13 sections along the project length for a minimum of 39 evaluation points. The base course should be covered with the wet burlap and plastic cover when not actively being constructed and at the end of its construction. It may be necessary at times to recharge the burlap with additional water to prevent moisture loss over longer periods of time. The burlap and plastic tarp to cover the subgrade must be available for use by WTI during the entire project.

#### **F. Forensic Excavation of Subgrade**

Trafficking of the test sections will be performed by WTI staff using a loaded three-axle dump truck. This activity will occur for approximately 1 month after construction of the base course. After trafficking, various sections of the test plot will be removed to forensically investigate how they performed. As illustrated in Figure 3, full-depth (3 feet 8 inches) excavation in each of the 13 test sections near the location of the sensors will be needed across the 13-foot test section with a width of 4.5 feet. The contractor is responsible for gently breaking up the base course. WTI will rent an industrial vacuum to facilitate careful removal of the base aggregates above the geosynthetic without causing damage to the geosynthetic; WTI will also cut out the exposed portion of geosynthetic (if present). The contractor will then carefully excavate the subgrade and WTI will take pictures and samples within each of the exposed areas for research purposes. Afterward, these areas will be loosely filled in by the contractor using the subgrade and base excavation spoils.



**Figure 3: Forensic excavation layout**

#### **G. Clean up**

WTI will be responsible for removing any leftover subgrade soil in the storage berm. The contractor is responsible for sweeping the taxiway in the construction area to remove excess construction-related debris. The contractor is also responsible for removing any surplus gravel that was used to construct the base course driving surface and sweeping all affected surfaces without disturbing the constructed project test site.

#### **2. MEETINGS AND SCHEDULES**

A mandatory meeting will be held in Lewistown for all interested contractors on Monday June 2 to meet WTI, review specific details regarding the project, see the project location, assess the subgrade material and ask questions. The meeting will begin at 9:00AM at the Montana Department of Transportation, 1620 Airport Rd, Lewistown, MT 59457 in the conference room.

A required Preconstruction Meeting between the winning bidder and WTI will be held in Lewistown 5 to 10 business days prior to construction of the test sections. The University will arrange the meeting once the winning bidder is selected.

The estimated schedule for bidding and construction is:

- June 2, 2008: Pre-Bid Meeting (Mandatory)
- June 13, 2008: Closing date to submit bids
- June 16, 2008: Contract award notification
- June 16 through June 23, 2008: Preconstruction Meeting (one day within this time frame)
- June 30 through July 3, 2008: Mobilize and excavate

- July 7 through July 25, 2008: Construct subgrade
- July 28 through August 8, 2008: Install instrumentation and geosynthetics (WTI's responsibility)
- August 11 through August 13, 2008: Construct base course (Contractor's responsibility)
- September 1 through September 5, 2008: Forensic excavation

### **3. HOW TO RESPOND**

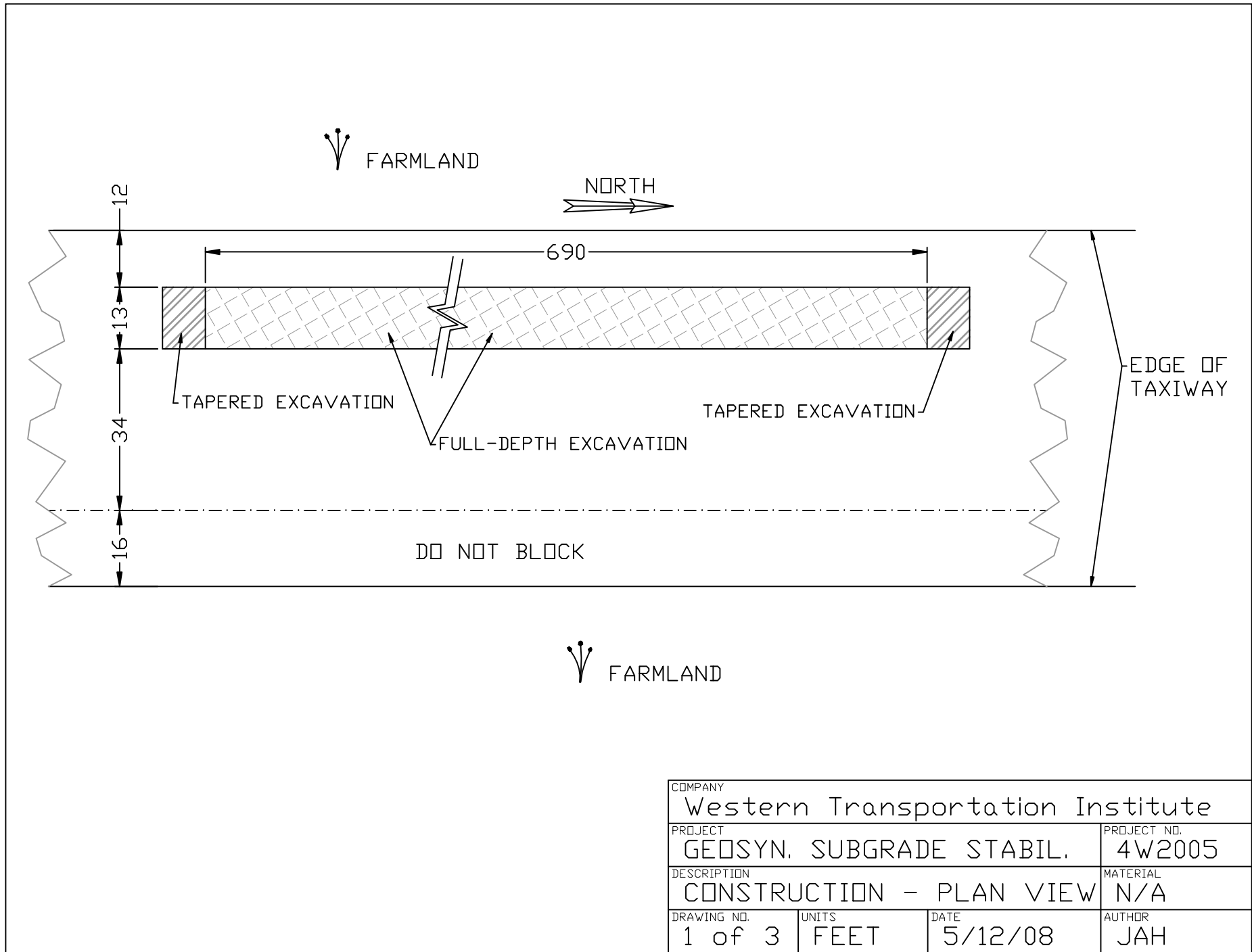
Respond to WTI with a written proposal that specifies 1) a methodology for construction, 2) a description of the construction equipment and 3) an itemized bid dollar amount. The proposal and itemized bid may be delivered via email, fax, or mail by June 13, 2008 using the following contact information:

Eli Cuelho  
Western Transportation Institute  
PO Box 174250  
Bozeman, MT 59717-4250  
Phone: (406) 994-7886  
Fax: (406) 994-1697  
Email: [elic@coe.montana.edu](mailto:elic@coe.montana.edu)

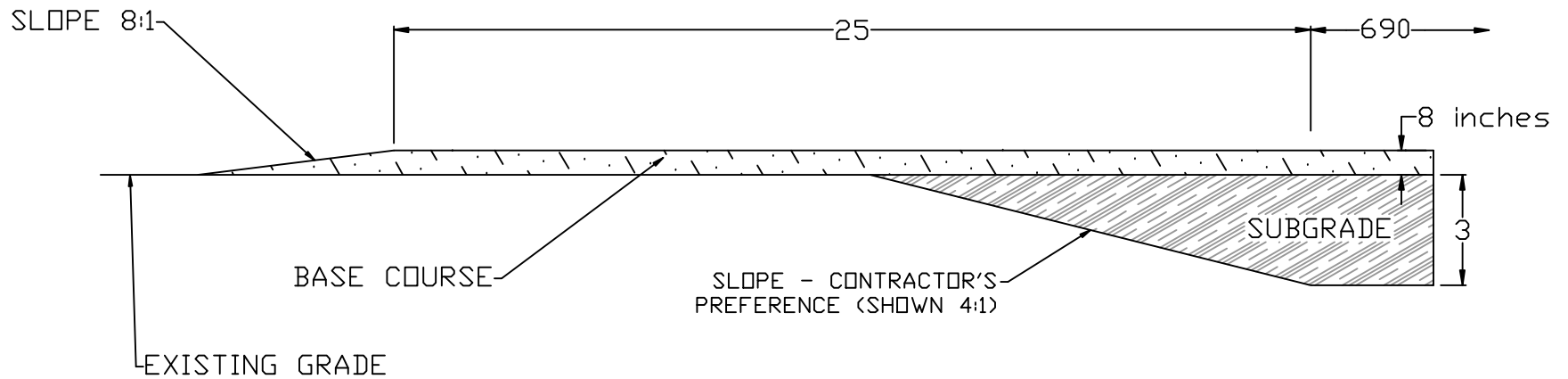
All questions should be directed to Eli Cuelho. Responses to any questions will be provided to all bidding contractors by email within 2 business days from the inquiry. This bid document and the corresponding proposal that will meet the contract requirements with the lowest bid amount will be part of the contract to be put in place. Read Appendix B before responding to ensure all additional requirements (registration, wage rates, etc.) are satisfied.

# Appendix A

## Construction Drawings

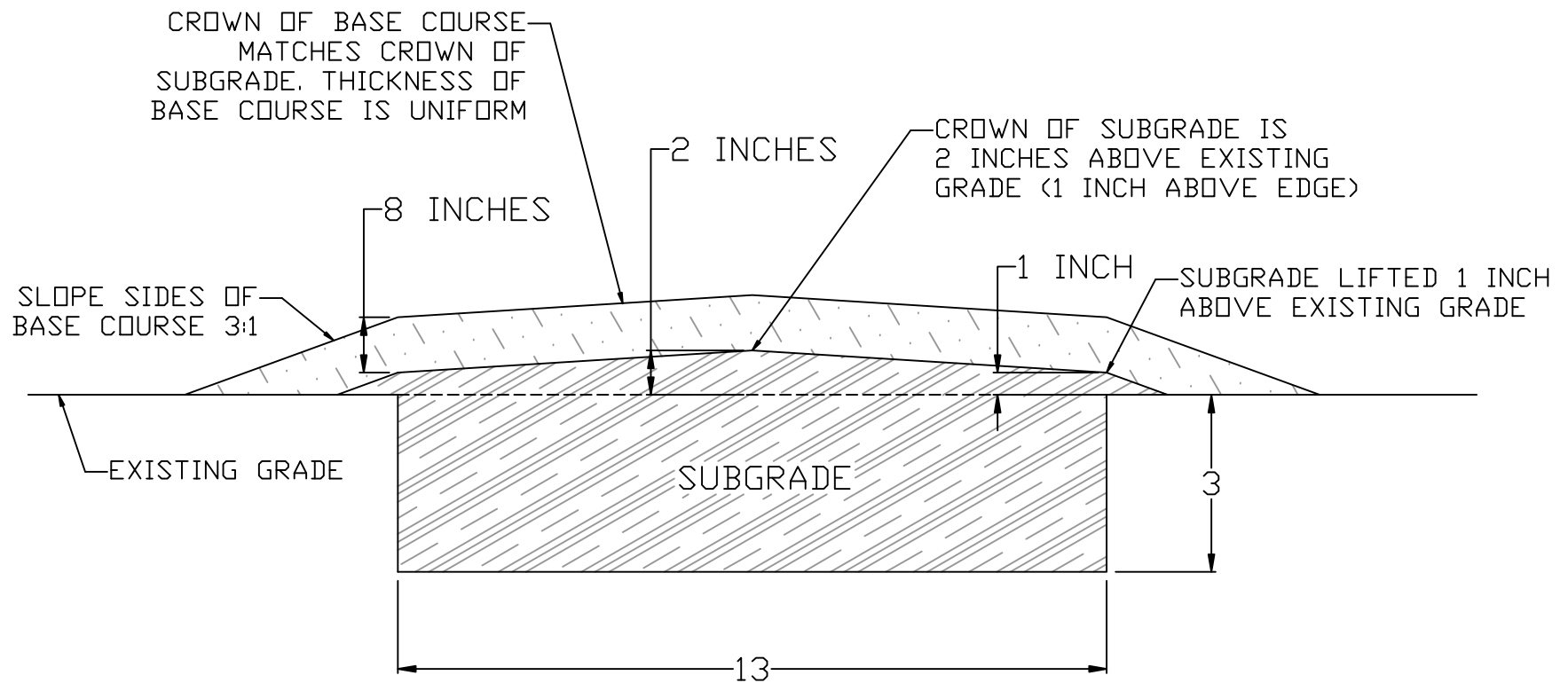


# LONGITUDINAL CROSS SECTION



COMPANY Western Transportation Institute			
PROJECT GEOSYN. SUBGRADE STABIL.		PROJECT NO. 4W2005	
DESCRIPTION CONSTRUCTION - X SECTION		MATERIAL N/A	
DRAWING NO. 2 of 3	UNITS FEET	DATE 5/12/08	AUTHOR JAH

# TRANSVERSE CROSS SECTION WITH CROWN DETAIL



NOT TO SCALE

COMPANY Western Transportation Institute			
PROJECT GEOSYN. SUBGRADE STABIL.		PROJECT NO. 4W2005	
DESCRIPTION CONSTRUCTION - CROWN		MATERIAL N/A	
DRAWING NO. 3 of 3	UNITS FEET	DATE 5/12/08	AUTHOR JAH

## Appendix B

### Additional Bidding & Contracting Information & Requirements

The following information is pertinent to all contractors responding to this request for bids.

- A. The Contractor is required to be registered with the Department of Labor & Industry before the contract is executed for all projects greater than \$2,500.00. Provide a copy of your Contractor's Registration Certificate. The following website provides an alphabetical listing of the contractors who are registered:  
[http://mtcontractor.com/crx/cr\\_parms.htm](http://mtcontractor.com/crx/cr_parms.htm)
- B. Bid Security in the amount of 10% of Bid Amount is required (see MCA 18-2-302 Bid Security Information on page B-2)
- C. Montana Prevailing Wages for Highway Construction 2007 must be paid by the contractor to their employees. The current prevailing wage rates are available at the following website:  
[http://www.ourfactsyourfuture.org/admin/uploadedPublications/1976\\_PW\\_Hwy07\\_Web.pdf](http://www.ourfactsyourfuture.org/admin/uploadedPublications/1976_PW_Hwy07_Web.pdf)
- D. The Contractor and Subcontractors shall give preference to the employment of bona-fide Montana residents in the performance of the work as required by 18-2-403, Montana Code Annotated.
- E. Contract Performance Security is required for contracts over \$50,000 (surety bond for 100% of contract amount submitted with Form 112 Performance Bond, shown on page B-3; Questions & Answers on Contract Performance Security are provided on page B-4).
- F. Proof of Insurance is required and must be received prior to starting the job. Additional details are provided in the example contract.
- G. The example contract begins on page B-11
- H. Form 101, Periodic Estimate for Partial Payment, see page B-15 (referred to in the example contract)

## Bid Security Information

### Montana Code Annotated - 2007

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**18-2-302. Bid security -- waiver -- authority to submit.** (1) (a) Except as provided in subsection (2), each bid must be accompanied by bid security in the amount of 10% of the bid. The security may consist of cash, a cashier's check, a certified check, a bank money order, a certificate of deposit, a money market certificate, or a bank draft. The security must be:

(i) drawn and issued by a federally chartered or state-chartered bank or savings and loan association that is insured by or for which insurance is administered by the federal deposit insurance corporation;

(ii) drawn and issued by a credit union insured by the national credit union share insurance fund; or

(iii) a bid bond or bonds executed by a surety company authorized to do business in the state of Montana.

(b) The state or other governmental entity may not require that a bid bond or bond provided for in subsection (1)(a)(iii) be furnished by a particular surety company or by a particular insurance producer for a surety company.

(2) The state or other governmental entity may waive the requirements for bid security on building or construction projects, as defined in [18-2-101](#), that cost less than \$25,000.

(3) The bid security must be signed by an individual authorized to submit the security by the corporation or other business entity on whose behalf the security is submitted. If the request for bid or other specifications provided by the state or other governmental entity specify the form or content of the bid security, the security submitted must comply with the requirements of that specification.

**History:** En. Sec. 3, Ch. 149, L. 1927; re-en. Sec. 259.3, R.C.M. 1935; amd. Sec. 2, Ch. 193, L. 1977; amd. Sec. 1, Ch. 487, L. 1977; R.C.M. 1947, 82-1133; amd. Sec. 3, Ch. 250, L. 1987; amd. Sec. 9, Ch. 130, L. 1995; amd. Sec. 6, Ch. 249, L. 1997; amd. Sec. 1, Ch. 282, L. 1999; amd. Sec. 3, Ch. 203, L. 2003.

Provided by Montana Legislative Services



# Performance Bond

Form No. 112 MSU

## PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we (Contractor), hereinafter called the Principal, and (Surety), a corporation licensed under the laws of the State of Montana, hereinafter called the Surety, are held and firmly bound unto the State of Montana in the full and just sum of , to be paid to the State of Montana or its assigns, to which payment we bind ourselves, heirs, executors, administrators, successors and assigns, jointly, severally, firmly by this bond.

WHEREAS, the Principal has entered into a contract with the State of Montana, acting by and through MONTANA STATE UNIVERSITY, dated \_\_\_\_\_ for AND

WHEREAS, it is one of the conditions of the award of the contract pursuant to statutes that this bond be executed:

NOW, THEREFORE, the conditions of this obligation are such that if the above Principal as Contractor shall promptly and faithfully perform all of the provisions of the contract, and all obligations thereunder including the specifications, and any alterations provided for, and shall in a manner satisfactory to the State of Montana, complete the work contracted for including any alterations, and shall save harmless the State of Montana from any expense incurred through the failure of the Contractor to complete the work as specified, then this obligation shall be void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any extension of time and any alterations made in the terms of the contract, unless the cumulative cost of such alterations cause the total project cost to exceed the original contract sum by more than 10%.

PRINCIPAL:

Date: \_\_\_\_\_

\_\_\_\_\_

SURETY:

\_\_\_\_\_  
Address

\_\_\_\_\_  
Surety

\_\_\_\_\_  
(Seal)

By: \_\_\_\_\_  
Attorney-in-fact (Seal)

\_\_\_\_\_  
Agency

\_\_\_\_\_  
Address

Date: \_\_\_\_\_

# Questions and Answers on Contract Performance Security

## DEPARTMENT OF ADMINISTRATION GENERAL SERVICES DIVISION STATE PROCUREMENT BUREAU

[www.mt.gov/dao/gsd](http://www.mt.gov/dao/gsd)



BRIAN SCHWEITZER  
GOVERNOR

STATE OF MONTANA

MITCHELL BUILDING, ROOM 165  
PO BOX 200135

(406) 444-2575  
(406) 444-2529 FAX  
TTY Users-Dial 711

HELENA, MONTANA 59620-0135

### Questions and Answers on Contract Performance Security

Prepared by the Department of Administration  
October 2007

#### 1. What is "contract performance security"?

"Contract performance security" is a financial guarantee that is available to the State should a contractor fail to faithfully perform a contract or pay workers, subcontractors or material suppliers who have worked on the contract.

#### 2. Does the State have an option on whether or not to require contract performance security?

For contracts issued under the authority of the Montana Procurement Act, the State has an option on whether or not to require contract performance security. In fact, under section 18-4-312, MCA, the State has three choices to make concerning contract performance security:

- Should contract performance security be required for this contract?
- If so, in what amount?
- And if so, what types of security should be accepted?

For contracts issued for construction projects, contract security equal to at least the contract sum is required for all projects over \$50,000 (Mont. Code Ann. § 18-2-201).

#### 3. What does the contract performance security cover?

Under section 18-4-312(1), MCA, of the Montana Procurement Act, two things are covered by contract performance security:

- the faithful performance of the contract and
- the payment of all laborers, suppliers, mechanics, and subcontractors.

This means that if a contract is breached, the contract security should cover the additional cost of getting the contract completed by a different contractor and the payment of any outstanding wages or payments owed to workers, subcontractors, or suppliers.

Contractperformancesecurity Q&As  
Revised 10/07

"AN EQUAL OPPORTUNITY EMPLOYER"

#### 4. What types of security are allowed?

Under the Montana Procurement Act, the following types of security may be accepted by the State: a bond with a licensed surety company; a letter of credit; cash; a cashier's check; certified check; bank money order; certificate of deposit; money market certificate; or bank draft that is drawn on a federally or state chartered bank or savings and loan association or that is drawn and issued by a credit union. Personal checks are not accepted. See section 18-4-312, MCA, for full details. It is important to note that the State is not required to accept all types of security and retains the option of only accepting certain types of security, such as a surety bond.

Please note that any security must be in a form that the State can utilize without any further approval of the contractor. For example, all certificates of deposit must be assigned only to the State of Montana and must not require the signature of the contractor.

#### 5. Is one type of security preferable to another?

Yes! Surety bonds are much more valuable to the State as contract security than other security options (letter of credit, certificates of deposit, etc.) for the following reasons:

- Surety bonds cover *100% of the value* of the contract even if the State only required "25% of the contract value" for instance. On the other hand, letters of credit or certificates of deposit are only for a *specified amount*. If, therefore, the State needs to recover costs due to a breach of contract, the letter of credit will only cover costs up to a certain dollar amount. In contrast, a bond makes the State "whole" and the State will more likely not be left with unpaid costs due to a breach of contract.
- Letters of credit are issued for a particular length of time and could expire before a problem is discovered. In contrast, a surety bond remains in effect until the contract is complete.

*Agencies need to be aware that surety bonds are harder for some businesses to obtain and that the cost of the business obtaining the surety bond is typically passed along to the State in the form of higher contract costs.*

#### 6. What factors should an agency consider in making a decision on whether contract performance security is required and if so, what type of security should be acceptable?

First, an agency needs to decide if contract performance security should be required based on several factors:

- The nature of the contract;
- The potential cost of completing the project if there is a breach of contract;
- Whether the agency can afford to self-insure the risk;
- Will numerous workers, subcontractors and material suppliers likely be involved;
- Whether other contract management tools can be used to help control any risks in contract performance such as liquidated damages, retainages, deliverables, etc.;
- Performance history of similar contract endeavors.

If a decision is made to require contract security, the next step is to decide what types of contract security instruments should be accepted. Agencies should consider accepting only surety bonds for contract security in the following instances:

- If the contract involves software development;
- If there is a risk that the State would be left with great expense in getting a contract completed in the

- event of a breach of contract midway through a project;
- The contract involves many workers, subcontractors, or material suppliers that might be left unpaid by the contractor in the event of a breach of contract.

Agencies should consider accepting *all* forms of lawful contract security (surety bonds, letters of credit, money market certificates, certificates of deposit, or cash) in these instances:

- If the risk to the State of a breach of contract is minimal;
- If the costs associated with completing a contract in the event of a breach of contract will not be great; or
- If the contract is for a small dollar amount.

#### **7. Does the State Procurement Bureau have Standard Statements to address situations where an agency might want to limit the types of contract security it requires?**

The State Procurement Bureau has two Standard Statements available regarding contract security. One is for the situation where only surety bonds will be permitted (see <http://gsd.mt.gov/procurement/standardcontractlanguage.asp>, Standard Contract Language, "Contract Performance Security – Surety Bonds").

A second SPB Standard Statement is available for those instances where contract security will be required, but forms of security other than surety bonds would be acceptable (see <http://gsd.mt.gov/procurement/standardcontractlanguage.asp>, Standard Contract Language, "Contract Performance Security – All Forms Accepted").

#### **8. Are there times when contract security should always be required?**

Other than in construction contracts, no. Each case must be looked at to determine the State's monetary risk coupled with the additional costs or inefficiencies of security. If the task is important and risky, an array of incentives, payment timing, retainages, and other strategies should be put in place to help insure contract completion, in addition to contract security. The key thing to understand is that we don't really want damages; we want performance.

#### **9. How much security should be required?**

Under the Montana Procurement Act, the State has the option of deciding how much contract performance security to require. The first thing to note is that the courts will not allow the *keeping* of any more security than it takes to make the State "whole." Security should be no more than the amount the State could possibly lose on a contract. Often the measure of damages is how much it would cost to replace the failed contract with another one and how much it would take to pay off workers and subcontractors if the contractor failed to pay them. However, the amount of damages should be balanced against the risk of a breach of contract versus the increased cost of the contract due to a contractor passing along the costs associated with obtaining the required security.

If there are times within a contract period where more or less is at risk, the requirement can be for differing levels of security. You can also require retainages or pay only after certain mileposts have passed. Coupling liquidated damages with security requires consulting with your legal counsel because often you forego getting both actual and liquidated damages unless the contract is crafted very carefully.

**NOTE CONCERNING CONSTRUCTION CONTRACTS:** If the contract in question is for "construction over \$50,000" (as defined in section 18-2-101, MCA), contract security must be required for at least 100% of the value of the contract.

**10. What are “liquidated damages” and when should this be required instead of contract performance security?**

Where actual damages would be very difficult to determine after a breach of contract, we are allowed to set the presumed amount of actual damages as “liquidated damages.” To do so, you must use your best efforts to determine this amount accurately. This requirement for liquidated damages must be stated in the RFP or IFB document. Once you have agreed to take your damages in this form, you forego actual contract damages even if they are much greater. Be forewarned that the courts tend to frown on the use of liquidated damages (see section 28-2-721, MCA).

To require both liquidated damages and contract performance security, you must be very specific in your contract since they both can't cover the same thing. Liquidated damages might be for only some types of deliverables and it must be clear that the intent is to not limit other damages, such as payment of workers and subcontractors. If this becomes an issue, see your attorney.

**11. What should be done to collect on a surety bond or letter of credit?**

First, read your contract on the subject of “notice to cure” provisions. Second, contact your attorney. After consultation with your attorney, contact the surety company or banking institution to inform them of the situation. Be ready to provide extensive documentation concerning the breach of contract and your ensuing damages.

**12. What is “notice to cure”?**

It is a requirement that the parties give notice to the other when there is a problem. A time to “cure” or fix the problem is usually given. If there is a failure to fix or cure the problem, the parties move to the next level, which will involve collecting on a surety bond or letter of credit in order to complete the project.

Agencies are now required to use the State's forms for accepting irrevocable letters of credit or surety bonds. These forms do not contain provisions for “notice to cure” requirements. If, however, other forms of bonds or letters of credit were accepted by an agency or are already on file, the documents may contain mandatory “notice to cure” requirements. Be sure to read the fine print of these documents before terminating or threatening to terminate a contract!

**NOTE:** Be sure to read the contract as soon as any problems develop and certainly before starting to terminate a contract. The contract may have “notice to cure” requirements that have to be met first.

**13. What is the difference between a “performance security” or “contract security” and “bid security” or “RFP security”?**

“Performance or contract security” typically insures performance of the contract and payment of workers and is usually referred to as “contract security.” “Bid or RFP security” just insures that a bidder or offeror is willing to enter into a contract after award.

**14. What is the difference between a “performance, labor, and materials bond” (PLM), a “contract bond” and a “payment bond”?**

Different terms have been used interchangeably for many years, but the differences need to be paid attention to. “Performance, labor, and materials (PLM) bonds” are typically used for construction projects and are referred to in state construction law (Mont. Code Ann. §§ 18-2-201 and 60-2-113). A PLM bond is issued to insure that the contractor and subcontractor labor and material suppliers are paid should the contractor be unable to pay and to cover the cost of completing or “performing” the contract.

A "contract bond" is generally meant to cover the same things as a PLM bond – the faithful performance of the contract and any unpaid wages or invoices left behind due to a breach of contract. Sometimes however, the requirements for a bond are broken out by a "payment bond" which is designed to pay any unpaid wages and invoices, and a "performance bond" which is issued to cover the costs of finishing or "performing" the contract.

*Contracts issued under the Montana Procurement Act require a "contract bond" that covers both the unpaid wages and invoices and the faithful performance of the contract.*

**15. Is the State liable for unpaid wages and invoices left behind by a contractor if we don't require contract security?**

Under state construction law in section 18-2-202, MCA, an agency is considered liable for unpaid workers, material suppliers, and subcontractors if it didn't require the necessary PLM bond. If construction is not involved, the requirements for "contract security" are governed by the Montana Procurement Act in section 18-4-312, MCA. In this instance, the law permits the agency to decide if security will be required and if so, in what dollar amount. A statement similar to the liability requirement in section 18-2-202, MCA, for construction *does not* exist in the Montana Procurement Act.

**16. What does it mean that contract performance security should be "in effect for the entire contract period"?**

When you request contract performance security it must be in place for the entire contract term. "Entire contract term" means the initial contract period, *not including possible renewals*. This means that if a contract runs for a three-year period, the contract security has to cover all three years. If a vendor wants to get security for shorter periods there is no guarantee they can get it for later. In essence, the vendor who cannot get security for the entire period has not met the solicitation requirements and may be not considered a "responsible" or "responsive" bidder or offeror as defined in section 18-4-301, MCA.

If your vendors cannot get security for the entire period, you may have asked for too much or maybe the vendor, in the financial institution's mind, has a high risk of failure. If time allows, you might try providing the vendor with a list of other financial institutions that have supplied bonds or letters of credit for similar procurements to other contractors before you move on to the next vendor, or suggest that they contact the federal Small Business Administration "Surety Bond Guarantee Program" at (406) 441-1081 in Helena. On rare occasions, you may be faced with a situation of needing to accept contract security for a time period less than the full contract period. If this is unavoidable, be sure to have language in the contract that requires at least a 90-day notice to you stating that the contractor has obtained security for the following time period. If you don't receive this assurance of security coverage, you will need to take steps to terminate the contract and then proceed to solicit a new contractor.

**NOTE:** Contracts must not be renewed until new or renewed contract security is in place covering the entire period of the renewal.

**17. Can contract performance security requirements be altered after the contract has been awarded?**

No. The State has a duty to award contracts based upon the specifications that were set out. An amendment to specifications before signing a contract should not be allowed.

**18. What should we do if a vendor is having a hard time getting contract performance security?**

First and foremost, every vendor should have checked out his or her ability to get contract performance security before submitting a bid or offer. Obviously the cost of obtaining security needs to be figured into

their submitted prices and we would question the reliability of any company not considering this.

In the event a vendor does discover that they are having difficulty in getting the required security, your agency can assist the vendor in considering other options. Can they go to another bond company or financial institution? Can they put up sufficient collateral to secure a bond or loan? Did they consider putting up personal property as collateral? Have they contacted the federal Small Business Administration "Surety Bond Guaranteed Program"? If all fails, go to the next vendor or cancel and reconsider your specifications before you go out again. Do not risk state resources by waiving a security requirement!

**19. Are there any special forms to be used when accepting a surety bond or irrevocable letter of credit?**

Yes, pursuant to ARM 2.5.502 the Department of Administration will supply the forms required to submit a surety bond or an irrevocable letter of credit for either contract performance security or for bid/proposal security. These forms can be found at <http://gsd.mt.gov/procurement/forms.asp>. This requirement to use these forms must be included in any solicitation requiring contract performance security or requiring bid/proposal security, unless the State Procurement Bureau approves an alternative form. The specific forms are: "Contract Performance Bond," "Bid or Proposal Bond," and "Irrevocable Letter of Credit."

**20. What if there is a conflict between the language in a bond and the requirements of an RFP?**

The State now requires that contractors use the State's Contract Performance Bond form or Irrevocable Letter of Credit form to submit bonds or letters of credit as security. Before an RFP is drafted, be sure that nothing in the RFP conflicts with the required forms.

**21. What is the approximate cost of a vendor obtaining a bond for \$100,000 for instance?**

Bonds are like insurance. It depends on the level of risk of the activity, the soundness of the insured, and the knowledge of the insurer. The cost of a bond for \$100,000 can range from \$250 to \$10,000. "Prime clients" may be required to only pay \$250 per \$100,000, while a "weak company" in the eyes of the surety company, will be charged the higher rates in order to be comfortable in providing the risk.

Where there are renewal periods, each extension should be treated as a new bond with a new cost by the bonding company. Sometimes the total cost of a bond may increase if there are renewals based on other agreed-to formulas.

Sometimes a potential contractor will overstate the importance of this cost in order to test your resolve in requiring a certain amount. Or sometimes, a vendor may have a business history that is uninsurable and clearly the State should not be contracting with them. At other times, however, the security requirements may make a project unreachable for small businesses and the State should consider this and examine the risks associated with a specific project before setting a required security amount.

**22. What is the difference between "contract performance security" and general liability insurance?**

"Contract performance security" is a bond that insures that the vendor will carry out its part of the contract. "Liability insurance" is insurance that covers an array of personal and property damages the vendor may cause to others, including the State, while carrying out their part of the contract. Liability insurance does not cover a breach of contract.

### **23. Are there major pitfalls concerning contract performance security?**

Yes! First, understand that bonding companies are not in business to pay you. They plan on keeping their money. You may well have to litigate with the bonding company and the contractor who has somehow breached the contract to recover any of your costs. Remember, contract performance security is not a "fine," but rather a way to recover the expenses of a getting a new contract in place if the first one fails, and paying unpaid workers, subcontractors, or material suppliers.

Unfortunately, sometimes even if the State does have the right to recover some costs, the vendor may already be bankrupt. Expect claims on any money from everywhere – the federal government, other state governments, creditors, laborers, and material suppliers. All will be claiming some sort of priority and it may take years to clear up.

Second, one key to a successful project is developing specifications and evaluation factors that lead to a qualified vendor in the first place. Another crucial key for the State is contract monitoring. Agencies must be prepared to devote the resources necessary to monitor the contract to assure that performance standards are met so we don't have to ever claim any security.

# Example Contract

## AGREEMENT

STATE OF MONTANA  
MONTANA STATE UNIVERSITY  
WESTERN TRANSPORTATION INSTITUTE

THE STANDARD FORM OF AGREEMENT BETWEEN CONTRACTOR AND OWNER FOR  
CONSTRUCTION

THIS CONTRACT IS SUBJECT TO ARBITRATION PURSUANT TO THE UNIFORM ARBITRATION ACT,  
MCA TITLE 27 CHAPTER 5

**THIS AGREEMENT MADE AS OF \_\_\_\_\_, BETWEEN \_\_\_\_\_,  
HEREINAFTER CALLED THE CONTRACTOR, AND THE STATE OF MONTANA, ACTING BY AND  
THROUGH MONTANA STATE UNIVERSITY, HEREINAFTER CALLED THE OWNER,  
WITNESSETH, THAT THE CONTRACTOR AND THE OWNER FOR THE CONSIDERATION  
HEREINAFTER NAMED AGREE AS FOLLOWS:**

### ARTICLE 1. SCOPE OF WORK

The Contractor shall perform all the Work at the \_\_\_\_\_ as shown in the proposals  
from \_\_\_\_\_. Dated \_\_\_\_\_.

### ARTICLE 2. TIME OF COMPLETION

The Work to be performed under this contract shall commence on a date set forth by the Owner in a written  
"Notice to Proceed" and shall be completed within \_\_\_\_\_ ( ) consecutive calendar days.

If the Work is not completed within the time specified, the Owner may assess liquidated damages of Five  
Hundred and no/100 (\$500.00) per calendar day.

### ARTICLE 3. THE CONTRACT SUM

The Owner shall pay the Contractor in current funds for the performance of the Work, subject to additions  
and deductions by Change Order or liquidated damages as provided in the Contract Documents, the total  
sum of: \_\_\_\_\_ DOLLARS.

### ARTICLE 4. PROGRESS PAYMENTS

The Owner shall make payments on account of the Contract as follows: Ninety-five percent (95%) of the  
portion of the Contract Sum for labor, materials, and equipment incorporated in the work and of materials  
suitably stored at the project site or at some other location agreed upon in writing. The Owner shall make  
payment within thirty (30) calendar days after receipt of Form 101, Periodic Estimate for Partial Payment  
request, subject to review and approval. The Contractor shall, within seven (7) days following receipt of  
payment from the Owner, make payment to the Subcontractor(s), less retainage as provided by the  
Contractor and Subcontractor(s).

### ARTICLE 5. FINAL PAYMENT

Final payment constituting the entire unpaid balance of the Contract Sum, shall be paid by the Owner to the  
Contractor when: 1) the Work is completed; 2) the Contract is fully performed; 3) a final Certificate for  
Payment is submitted; 4) a "Contractor's Affidavit of Completion, Payment of Debts and Claims, and  
Release of Liens" form is submitted; and 5) Consent of Surety Company to Final Payment form is  
submitted.

### ARTICLE 6. THE CONTRACT DOCUMENTS

The Bidding Documents, as described in Bidders' Instructions and Information, form the entire Contract  
and are totally a part of the Contract as if hereto attached or herein repeated.

**ARTICLE 7. STANDARD PREVAILING RATE OF WAGES AND PREFERENCE OF MONTANA LABOR**

For projects over \$25,000.00, the Contractor and Subcontractors shall pay, at a minimum, the standard prevailing rate of wages, including fringe benefits for health and welfare and pension contributions and travel allowance provisions in effect and applicable to the county or locality in which the work is being performed. These prevailing wage rates will be determined by the Commissioner of Labor and Industry, State of Montana in accordance with 18-2-401 and 18-2-402, Montana Code Annotated, and will be attached to the specifications and are incorporated herein.

The Contractor and Subcontractors shall give preference to the employment of bona-fide Montana residents in the performance of the work as required by 18-2-403, Montana Code Annotated.

**ARTICLE 8. TAXES/PERMITS/FEES.**

The Contractor shall secure and pay for all permits and inspections, give all notices, pay all taxes and fees and comply with all laws, ordinances, rules, regulations and lawful orders bearing on the performance of the work.

**ARTICLE 9. LABOR/MATERIALS EQUIPMENT.**

Unless otherwise specified, the Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, transportation, temporary construction and services for the proper execution and completion of the work. Unless otherwise specified, all material and equipment provided shall be new and in good condition. All workmanship shall be of good quality and in keeping with the standard of the respective trades.

**ARTICLE 10. HIRING PREFERENCE AND MONTANA PRODUCTS PREFERENCE.**

Products manufactured or produced in the State of Montana by Montana industry and labor shall be preferred for use in this project and in all materials, supplies, and equipment procured if such products, materials, equipment, and supplies are comparable in price and quality as prescribed in 18-1-112, Montana Code Annotated. For state construction projects within an Indian reservation, hiring preference will be given to Indian residents of the reservation who have substantially equal qualifications for any position. This preference will apply unless federal law specifically prohibits residency preference.

**ARTICLE 11. INSURANCE.**

The Contractor shall maintain for the duration of the contract, at its cost and expense, insurance against claims for injuries to persons or damages to property, including contractual liability, which may arise from or in connection with the performance of the work by the Contractor, its agents, employees, representatives, assigns, or subcontractors.

a. Hold Harmless and Indemnification: the Contractor agrees to protect, defend, and save the Owner, its elected and appointed officials, agents, and employees harmless from and against all claims, demands, causes of action of any kind or character, including the cost of defense thereof, arising in favor of the contractor, its agents, employees or any third parties on account of bodily or personal injuries, death, or damage to property arising out of services or work performed or omissions or work or in any way resulting from the acts, negligent or otherwise, in whole or in part, or omissions of the Owner, contractor, its agents, employees, assigns, and/or subcontractors under this Contract.

b. Contractor's Insurance: **insurance required under all sections herein shall be in affect for the duration of the contract.** Insurance required herein shall be provided by insurance policies issued only by insurance companies currently authorized to do business in the state of Montana. No Contractor or Sub-contractor shall commence work under this contract until all required insurance has been obtained. During the term of this contract, the Contractor shall, not less than thirty days prior to the expiration date of any policy for which a certificate of insurance is required, deliver to the Owner a certificate of insurance with respect to the renewal insurance policy. The Contractor shall furnish, upon request of the Owner, one copy of certificates of insurance for coverage herein required, which shall specifically set forth evidence of all coverage required by these contract documents and which shall be signed by authorized representatives of the insurance company or companies evidencing that insurance as required herein is in force and

will not be canceled, limited or restricted without thirty days' written notice by certified mail to the contractor and the Owner. The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits. Additionally, all certificates shall include the project name and A/E project number. The Contractor shall remain solely and completely liable and responsible for all insurance coverage requirements whether or not the Owner requests the certificates of insurance.

c. The Contractor shall carry **Workers' Compensation Insurance**. Such Workers' Compensation Insurance shall protect the Contractor from claims made by his own employees, the employees of any Sub-contractor, and also claims made by anyone directly or indirectly employed by the Contractor or Sub-contractor. The Contractor shall require each Sub-contractor similarly to provide Workers' Compensation Insurance.

d. The Contractor shall carry occurrence coverage **Commercial General Liability Insurance** including coverage for premises; operations; independent contractor's protective; products and completed operations; broad form property damage and comprehensive automobile liability insurance with not less than the following limits of liability:

\$1,000,000 per occurrence; aggregate limit of \$2,000,000

The **Commercial General and Automobile Liability Insurance** shall provide coverage for both bodily injury, including accidental death and property damage which may arise out of the work under this contract, or operations incidental thereto, whether such work and operations be by the Contractor or by any Subcontractor or by anyone directly or indirectly employed by the Contractor or by Sub-contractor, or by anyone for whose acts any of them may be liable. The Contractor shall maintain completed operations liability insurance required herein for a period of not less than one year after final payment or anytime the Contractor goes on to the location of the project.

i. The Contractor's liability insurance policies shall list the STATE OF MONTANA as an additional insured. The STATE OF MONTANA includes its officers, elected and appointed officials, employees and volunteers and political subdivisions thereof. Should the Contractor not be able list the state as an additional insured, the Contractor shall purchase a per occurrence Owner's/Contractor's Protective Policy (OCP) with the STATE OF MONTANA as the insured party in the same occurrence and aggregate limits as that indicated above for the Contractor's Commercial General Liability Policy.

ii. Property damage liability insurance shall be written without any exclusion for injury to or destruction of any building, structure, wires, conduits, pipes, or other property above or below the surface of the ground arising out of the blasting, explosion, pile driving, excavation, filling, grading or from the moving, shoring, underpinning, raising, or demolition of any building or structure or structural support thereof.

iii. The Contractor's insurance coverage shall be PRIMARY insurance as respects the state, its officers, elected and appointed officials, employees and volunteers. Any insurance or self-insurance maintained by the state, its officers, elected and appointed officials, employees and volunteers shall be excess of the Contractor's insurance and shall not contribute to it.

#### **ARTICLE 12. CONSTRUCTION CONTRACTOR REGISTRATION.**

The Contractor is required to be registered with the Department of Labor & Industry under 39-9-201 and 39-9-204 MCA PRIOR to the Contract being executed by the State of Montana for all projects greater than \$2,500.00 and a copy of the registration certificate must be provided the Owner.

#### **ARTICLE 13. GROSS RECEIPTS TAX.**

In compliance with 15-50-206 MCA, the Contractor will have 1% of his gross receipts withheld by the Owner from all payments due for Contracts over \$5,000. Each subcontractor who performs work greater

than \$5,000, shall have 1% of its gross receipts withheld by the Contractor. The Contractor shall notify the Department of Revenue on the department's prescribed forms.

**ARTICLE 14. EQUAL EMPLOYMENT OPPORTUNITY.**

All hiring and other employment practices shall be non-discriminatory, based on merit and qualifications without regard to race, color, religion, creed, political ideas, sex, age, marital status, physical or mental handicap, or national origin.

**ARTICLE 15. RECORD KEEPING.**

Payrolls and basic records pertaining to the project shall be kept on a generally recognized accounting basis and shall be available to the Owner, Legislative Auditor, the Legislative Fiscal Analyst or his authorized representative at mutually convenient times. Accounting records shall be kept by the contractor for a period of three years after completion and acceptance of the project by the Owner.

**ARTICLE 16. VENUE**

In the event of litigation or arbitration concerning the contract, venue shall be the Eighteenth Judicial District in and for the County of Gallatin, Montana, and the Agreement shall be interpreted according to the laws of Montana.

This Agreement entered into as of the day and year first written above:

**CONTRACTOR**

\_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

Taxpayer I.D. No. \_\_\_\_\_

SUBSCRIBED AND SWORN to me before this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public for the State of Montana

Residing at \_\_\_\_\_, Montana

My commission expires \_\_\_\_\_

**OWNER:        STATE OF MONTANA  
                     MONTANA STATE UNIVERSITY**

\_\_\_\_\_  
Director

\_\_\_\_\_  
Date

**END OF AGREEMENT**



# MONTANA STATE UNIVERSITY

## WESTERN TRANSPORTATION INSTITUTE

6<sup>th</sup> and Grant Street • P.O. Box 174250 • Bozeman, Montana 59717-4250

Phone: (406) 994-6356 • Fax: (406) 994-1697

**Project:**

**Date:**

**Period From:**

**To:**

**Pay Estimate #:**

### PERIODIC ESTIMATE FOR PARTIAL PAYMENT

**Project Name:**

**Location:**

**Contractor:**

**Address:**

**Phone:**

RETAINAGE ADJUSTMENT	
1. Total Retainage to Date:	
2. Less Securities Deposited:	
3. Retainage Withheld (1 - 2)	

CONTRACT AMOUNT STATUS	
1. Original Contract Amount:	
2. Net +/- by Change Order:	
3. Contract Amount to Date:	

CHANGE ORDER SUMMARY			
No.	Date Approved	Additions	Deductions
<b>TOTALS:</b>			
<b>NET TOTAL:</b>			

CONTRACT STATUS	
1. Work in Place (from next page):	
2. Total Work & Stored Material:	
3. Retainage Withheld:	
4. Total Earned Less Retainage:	
5. Less Previous Payments (+ 1 % Tax):	
<b>6. Amount Due This Payment:</b>	
7. Less 1% State Contractor's Tax:	
<b>8. Payment Due Contractor:</b>	

I hereby certify that this submitted request for payment is correct, true and just in all respects and that payment or credit has not previously been received. I further warrant and certify by submission of this request that all previous work for which payment has been received is free and clear of all liens, disputes, claims, security interests, encumbrances, or causes of action of any type or kind in favor of the contractor, subcontractors, material suppliers, or other persons or entities and do hereby release the Owner from such.

Submitted by: \_\_\_\_\_  
(Company/Contractor)

\_\_\_\_\_  
(Name) Date: \_\_\_\_\_

Reviewed by: \_\_\_\_\_  
(Consultant)

\_\_\_\_\_  
(Name) Date: \_\_\_\_\_

Approved by: **State of Montana, Montana State University**  
**Western Transportation Institute**

\_\_\_\_\_  
(Name) Date: \_\_\_\_\_

**SHEET No. \_\_\_\_ OF \_\_\_\_ SHEETS**

## WORK IN PLACE/STORED MATERIALS

Project Name:  
Location:

Contractor:  
Address:

Project:  
Date:  
Pay Estimate #:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED		MATERIALS PRESENTLY STORED ( NOT IN D OR E )	TOTAL COMPLETED AND STORED TO DATE ( D + E + F )	% ( G / C )	BALANCE TO FINISH ( C – G )	RETAINAGE
			FROM PREVIOUS APPLICATION ( D + E )	THIS PERIOD					
	PAGE TOTALS:								
	GRAND TOTALS:								